

Heteronarce rierai, a New Narkid Ray from Mozambique, Western Indian Ocean

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Abstract *Heteronarce rierai* sp. nov. is described on the basis of six specimens, one male and five females, caught in the waters off Mozambique (western Indian Ocean). Total lengths range from 257 to 296 mm. The new species is distinguished from the three other species of the genus *Heteronarce* by its narrower disc width (29.6% of TL in male, and 33.0 to 39.2% of TL in females), shorter disc length (32.7% of TL in male, and 34.4 to 40.6% of TL in females), and its longer interdorsal distance (10.1 to 11.7% of TL).

Six specimens of a new species of electric ray, referable to the genus *Heteronarce*, were discovered in some samples of fishes caught by a shrimp trawler in Mozambique waters (western Indian Ocean). There are two nominal species of *Heteronarce* represented in the western Indian Ocean: *H. mollis* (Lloyd) occurring in the Arabian Sea (Lloyd, 1907; Norman, 1939; Fowler, 1956; Wallace, 1967) and *H. garmani* Regan occurring south of East London, South Africa (Regan, 1921; Von Bonde and Swart, 1924; Barnard, 1925; Fowler, 1925; Wallace, 1967; Hulley, 1972; Smith, 1977 and other editions; Compagno, 1986). The six specimens of *Heteronarce* from Mozambique differ from both of the nominal species and are herein described as a new species.

Material and methods

This paper is based on material held at the Ichthyological Reference Collection (IIPB) of the Instituto de Ciencias del Mar, Barcelona (Spain), and on some specimens of the British Museum (Natural History) (BMNH). The methods, measurements and terminology used follow Lloris (1986), except for nasal curtain length and internarial width.

Heteronarce rierai sp. nov.

(New Spanish name: Torpedo de Riera)

(Figs. 1–3)

Holotype. IIPB 82/1987, male, 257 mm TL, caught at 21°10'S and 35°37'E, Mozambique (western Indian Ocean), by a demersal shrimp trawler on November 11, 1982; depths ranging from 169 to 188 m.

Paratypes. IIPB 527/1986, 528/1986, females, 272 and

285 mm TL respectively, caught with the holotype; IIPB 577/1986, 578/1986 and, 579/1986, females, 286, 268 and 296 mm TL respectively, caught at 21°17'S and 35°37'E, Mozambique (western Indian Ocean), by the same trawler on November 8, 1982 at depths ranging from 184 to 188 m.

Comparative material. *Heteronarce garmani*, IIPB 84/1987, male, 169 mm TL and IIPB 83/1987, female, 214 mm TL; both captured with the *H. rierai* holotype. *Heteronarce mollis*, BMNH 1939.5.24.16, female, 188 mm TL, caught at the Gulf of Aden ("Murray" Exp.).

Diagnosis. Disc subcircular, elongated: disc width 29.6 to 39.2% of TL, disc length 32.7 to 40.6% of TL. Tail sector longer than body; each side of tail with a thin ribbon-like longitudinal fold, originated near the third rear end of first dorsal fin and reaching the first third of the caudal fin. Spiracle immediately behind eye. Nostrils either simple. Joint nasal curtain, slightly wider than longer. Two dorsal fins; interdorsal distance very long (10.1 to 11.7% of TL). Posterior margin of pelvis not joined across base of tail by a continuous membranous connection.

Description. Measurements and proportions are given in Tables 1 and 2. Disc subcircular, elongated, moderately flat and rounded at its posterior end; dorsal and ventral surfaces smooth; disc width less than disc length and 3.4 in TL in holotype (2.6–3.0 in paratypes) (from now, paratype figures are shown in parentheses); disc length 3.1 (2.5–2.9) in TL. Tail sector longer than disc length; distance from snout tip to centre of cloaca 2.5 (2.4–2.5) in TL; distance from centre of cloaca to caudal fin 1.7 in TL (holotype and paratypes). Each side of tail with a thin ribbon-like longitudinal fold. Preorbital snout length 9.9 (11.0–11.8) in TL. Eyes normally developed and

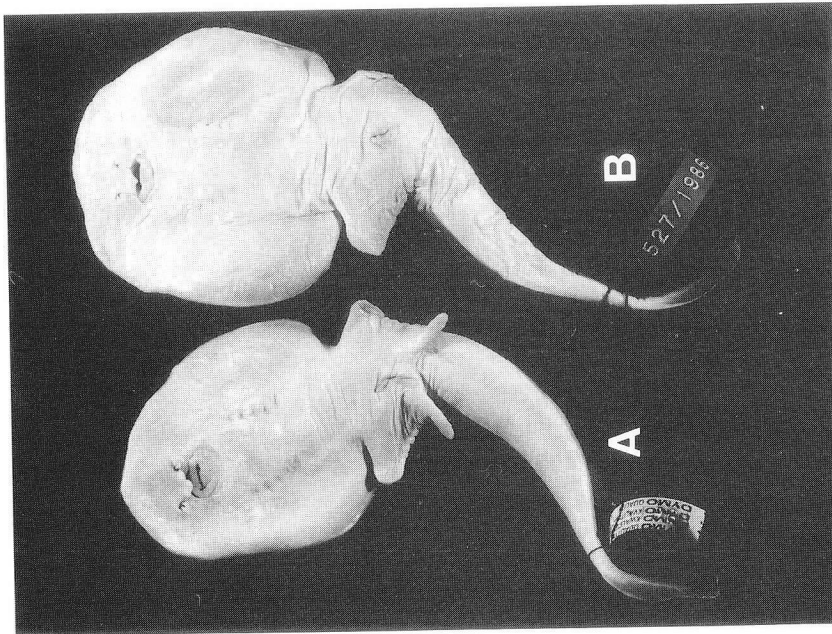


Fig. 2. *Heteronarcis rierai* sp. nov., ventral view. A, holotype, 257 mm TL, male, IIPB 82/1987; B, paratype, 272 mm TL, female, IIPB 527/1986.

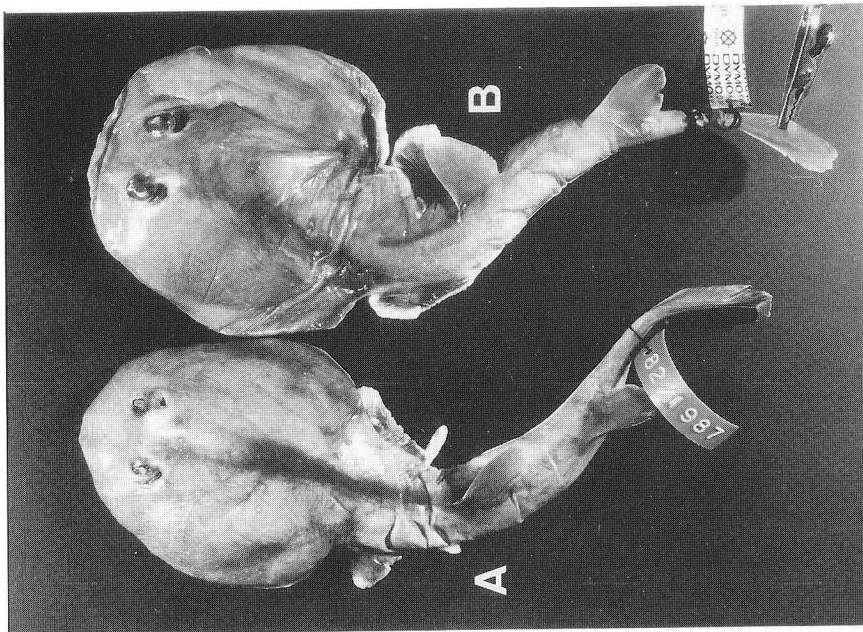


Fig. 1. *Heteronarcis rierai* sp. nov., dorsal view. A, holotype, 257 mm TL, male, IIPB 82/1987; B, paratype, 272 mm TL, female, IIPB 527/1986.

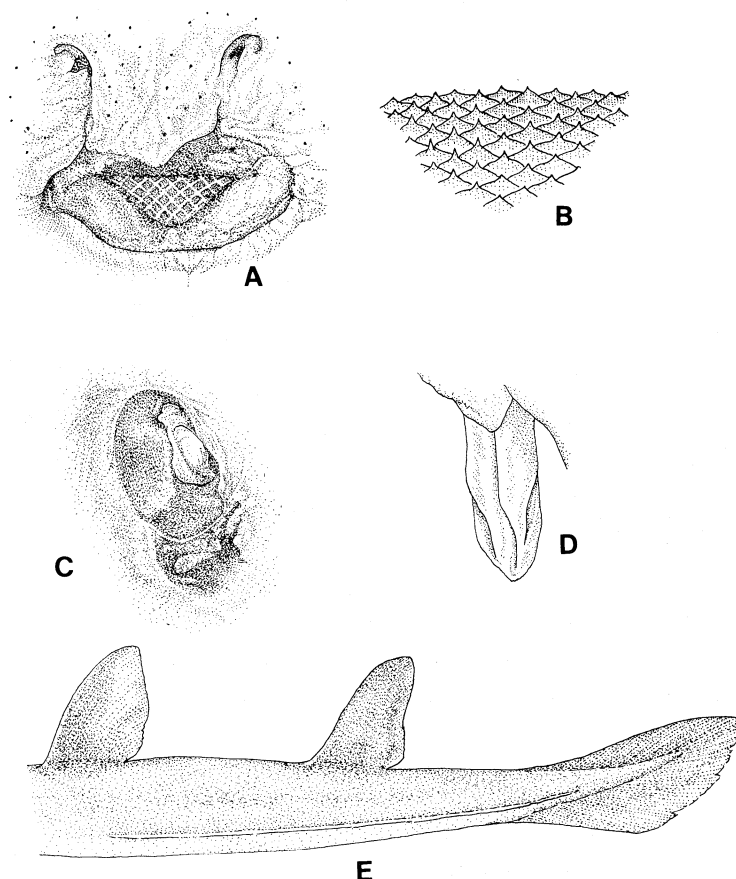


Fig. 3. *Heteronarce rierai* sp. nov. A, paratype, 272 mm TL, female, nostril and mouth; B–E, holotype, 257 mm TL, male; B, lower teeth from center of mouth; C, eyeball and spiracle; D, external view of right clasper from the dorsal side; E, side view of tail with the thin ribbon-like longitudinal fold.

functional; eyeball longitudinal diameter 2.0 (1.2–1.5) in interorbital width. Spiracle immediately behind eye and equal to eye length, without tubercles or folds on its external margin (Fig. 3C). Nostrils simple, not subdivided into separate apertures by cross bridge; separated from mouth, but connected by a ridge to furrow surrounding mouth. Joint nasal curtain not fringed, slightly wider than long, 1.7 (1.0–1.1) in internarial width. Mouth very small, not widely distensible; upper and lower jaw cartilages bound together at each corner of mouth by a labial cartilage formed by two triangular elements; cartilages rigidly articulated to each other; integument bearing the tooth bands loosely attached to jaw cartilages (Fig. 3A). Lower jaw teeth set in quincunx; 10 rows; minutely cuspidated teeth in male, and without cusp in females (Fig. 3A, B). Five pairs

of gill openings on the underside of disc; first interbranchial width 9.9 (7.9–10.1) in TL; 5th interbranchial width 12.2 (9.2–13.0) in TL. Two dorsal fins, well developed, interdorsal distance noticeably long, 8.6 (8.9–9.9) in TL (Fig. 3E). Origin of first dorsal fin slightly posterior to base end of pelvics. Posterior margin of pelvics not joined across base of tail by a continuous membranous connection; tips of pelvics rather separated from sides of tail. Clasper short, its cross section is more or less oval and somewhat depressed (Fig. 3D). When fresh and after preservation in formalin, colour of dorsal surface pale brown, with darkish areas; ventral surface of disc white.

Distribution. Only known from the type locality, near Beira (Mozambique), western Indian Ocean.

Etymology. The specific name is devoted to our

common friend Mr. Ignacio Riera, Chief of the Spanish Fisheries Office (Seychelles).

Remarks. The new species is assigned to the family Narkidae sensu Compagno (1973, 1986), or Torpedinidae sensu Bigelow and Schroeder (1953), Wallace (1967) and Nelson (1984).

The species is included in the genus *Heteronarce* according to the criteria of Bigelow and Schroeder (1953), and Nelson (1984: 61).

Bigelow and Schroeder manifest a very close relation between *Heteronarce* and *Narcine*, to the point that the validity of *Heteronarce* is somewhat doubtful (1953: 89). The situation is significantly incoherent as they are classified in different families. Among other authors, Séret and McEachran (1986) propose a simultaneous revision of both families and included genera and species. This work should organize the existing nominal species according to phylogenetic

guidelines.

The holotype and paratypes of *Heteronarce rierai*, are deposited in the Ichthyological Reference Collection at the Instituto de Ciencias del Mar, Barcelona.

Acknowledgments

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Table 1. Measurements and proportions (% of Total Length) for *Heteronarce garmani* Regan, 1921 (average of 2 specimens); *H. mollis* (Lloyd, 1907) (1 specimen); and *H. rierai* sp. nov. (average of 6 specimens).

	<i>H. garmani</i>		<i>H. mollis</i>		<i>H. rierai</i> sp. nov.	
	mm	%	mm	%	mm	%
Total length	191.5	100	188.2	100	277.3	100
Disc width	98.0	51.2	100.0	53.1	97.8	35.3
Disc length	93.0	48.6	94.0	49.9	102.2	36.9
Preorbital snout length	19.0	9.9	15.9	8.4	24.8	8.9
Interorbital width	11.0	5.7	15.1	8.0	14.0	5.0
Eyeball longitudinal diameter	5.5	2.9	6.1	3.2	9.5	3.4
Eyeball + spiracle	10.0	5.2	12.2	6.5	14.3	5.2
Distance from snout tip to 1st dorsal origin	124.0	64.8	109.0	57.9	140.8	50.8
Distance from snout tip to 2nd dorsal origin	141.0	73.6	131.2	69.7	190.5	68.7
1st interbranchial width	26.0	13.6	30.9	16.4	30.8	11.1
5th interbranchial width	16.5	8.6	21.6	11.5	24.7	8.9
Interdorsal length	9.0	4.7	9.4	5.0	29.7	10.7
Prenasal snout length	17.0	8.9	16.4	8.7	19.3	7.0
Internarial width	—	—	—	—	9.2	3.3
Nasal curtain length	—	—	—	—	7.8	2.8
Mouth width	9.0	4.7	10.4	5.5	9.3	3.4
Distance from snout tip to centre of cloaca	97.5	50.9	90.2	47.9	114.3	41.2
Distance from centre of cloaca to caudal fin tip	94.0	49.1	98.0	52.1	163.0	58.8
Collection indicator	IIPB		BMNH		IIPB	
Collection numbers	83/1987 84/1987		1939.5.24.16		527/1986 528/1986 577/1986 578/1986 579/1986 87/1987	
Locality	Mozambique		Gulf of Aden		Mozambique	

comments on the studied specimens. Thanks are also offered to Dr. M. Stehmann, Institut für Seefischerei, University of Hamburg, for his valuable suggestions and critical reading of the manuscript. Mr. Joan Biosca provided photographic assistance.

Literature cited

- Barnard, K. H. 1925. A monograph of the marine fishes of South Africa. Part I. Ann. S. Afr. Mus., (21): 1-418.
- Bigelow, H. B. and W. C. Schroeder. 1953. Sawfishes, guitarfishes, skates and rays. Pages 1-189 in J. Tee-Van et al., eds. Fishes of the western North Atlantic. Part 2. Mem. Sears Found. Mar. Res., No. 1, Pt. 2.
- Compagno, L. J. V. 1973. Interrelationships of elasmobranchs. Pages 15-61 in P. H. Greenwood et al., eds. Interrelationships of fishes. Zool. J. Linn. Soc., 53, Suppl. No. 1.
- Compagno, L. J. V. 1986. Family No. 24: Narkidae. Pages 113-114 in M. M. Smith and P. C. Heemstra, eds. Smith's sea fishes. Springer-Verlag.
- Fowler, H. W. 1925. Descriptions of three new marine fishes from the Natal Coast. Ann. Natal Mus., 5(2): 195-200.
- Fowler, H. W. 1956. Fishes of the Red Sea and southern Arabia. Vol. I. Branchiostomida to Polynemida. Weizmann Sci. Press, Jerusalem, 240 pp.
- Hulley, P. A. 1972. The origin, relationship and distribution of southern African Rajidae. Ann. S. Afr. Mus., 60(1): 1-103.
- Lloris, D. 1986. Ictiofauna demersal y aspectos biogeográficos de la costa sudoccidental de Africa (SWA/Namibia). Monogr. Zool. Mar., 1: 9-432.
- Lloyd, R. E. 1907. Contributions to the fauna of the Arabian Sea, with descriptions of new fishes and crustacea. Res. Ind. Mus., 1: 1-12.
- Nelson, J. S. 1984. Fishes of the world, 2nd ed. John Wiley and Sons, New York, viii + 523 pp.
- Norman, J. R. 1939. Fishes. Sci. Rep. John Murray Exped., London, 7(1): 1-116.
- Regan, C. T. 1921. New fishes from deep water off the coast of Natal. Ann. Mag. Nat. Hist., Ser. 9, 7: 412-420.
- Séret, B. and J. D. McEachran. 1986. Catalogue critique des types de poissons du Muséum National d'Histoire Naturelle. Bull. Mus. Natn. Hist. Nat., Paris, Sér. 4, 8, Section A(4), Suppl.: 3-50.
- Smith, J. L. B. 1977. Smith's sea fishes. The Trustees of the

Table 2. Measurements and proportions (% of Total Length) for *Heteronarce rierai* sp. nov. The paratypes are ordered by TL.

	Holotype		Paratypes									
	mm	%	mm	%	mm	%	mm	%	mm	%	mm	%
Total length	257	100	268	100	272	100	285	100	286	100	296	100
Disc width	76	29.6	98	36.6	93	34.2	94	33.0	112	39.2	114	38.5
Disc length	84	32.7	103	38.4	95	34.9	98	34.4	116	40.6	117	39.5
Preorbital snout length	26	10.1	23	8.6	23	8.5	25	8.8	26	9.1	26	8.8
Interorbital width	16	6.2	13	4.9	13	4.8	13	4.6	13	4.5	16	5.4
Eyeball longitudinal diameter	8	3.1	9	3.4	9	3.3	9	3.2	11	3.8	11	3.7
Eyeball + spiracle	15	5.8	14	5.2	14	5.1	14	4.9	15	5.2	14	4.7
Distance from snout tip to 1st dorsal origin	130	50.6	137	51.1	133	48.9	145	50.9	150	52.4	150	50.7
Distance from snout tip to 2nd dorsal origin	177	68.9	185	69.0	188	69.1	195	68.4	195	68.2	203	68.6
1st interbranchial width	26	10.1	32	11.9	27	9.9	31	10.9	36	12.6	33	11.1
5th interbranchial width	21	8.2	25	9.3	21	7.7	26	9.1	31	10.8	24	8.1
Interdorsal length	30	11.7	30	11.2	28	10.3	29	10.2	29	10.1	32	10.8
Prenasal length	18	7.0	18	6.7	18	6.6	19	6.7	21	7.3	22	7.4
Internarial width	10	3.9	9	3.4	9	3.3	8	2.8	10	3.5	9	3.1
Nasal curtain length	6	2.4	8	3.0	8	3.0	8	2.8	9	3.2	8	2.7
Mouth width	10	3.9	8	3.0	9	3.3	9	3.2	9	3.1	11	3.7
Distance from snout tip to centre of cloaca	102	39.7	112	41.8	112	41.2	115	40.4	120	42.0	125	42.2
Distance from centre of cloaca to caudal fin tip	155	60.3	156	58.2	160	58.8	170	59.6	166	58.0	171	57.8
Collection number [IIPB]	82/1987		578/1986		527/1986		528/1986		577/1986		579/1986	
Sex	male		female		female		female		female		female	
Locality	Mozambique		Mozambique		Mozambique		Mozambique		Mozambique		Mozambique	

- Sea Fishes of Southern Africa Book Fund, 580 pp.
Von Bonde, C. and D. B. Swart. 1924. The *Platostomia*
(skates and rays) collected by the S. S. "Pickle". Fish.
Mar. Biol. Surv. Rep., Ser. 3, 5: 22, pls. 20-23.
Wallace, J. H. 1967. The batoid fishes of the east coast of
southern Africa. Part III: Skates and electric rays.
Invest. Rep. Oceanogr. Res. Inst., (17): 1-62.

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西インド洋モザンビーク沖から採集されたシビレイ科
の1新種 *Heteronarce rierai*

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モザンビーク沖の西インド洋から採集された6個体(雄1, 雌
5)に基づいてシビレイ科の1新種 *Heteronarce rierai* を記載し
た。全長は 257-296 mm の範囲にある。本種は *Heteronarce* 属の
他3種のシビレイ類とは狭い体盤幅(雄で全長の 29.6%, 雌で
33.0-39.2%), 短い体盤長(同 32.7%, 34.4-40.6%), 長い両背鰭
間長(全長の 10.1-11.7%) で異なる。